<u>REMARKS</u>

The present application was filed on July 23, 2001 with claims 1-23. In the outstanding Office Action dated November 30, 2004, the Examiner has: (i) rejected claims 1-5 and 10-19 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,817,156 to Bahl et al. (hereinafter "Bahl"); and (ii) indicated that claims 6-9 and 20-23 are allowable.

In this response, Applicants traverse the §102(b) rejection for at least the reasons set forth below. Applicants request an acknowledgment of the receipt of formal drawings filed on September 4, 2001, as well as an acknowledgment of a claim for priority under 35 U.S.C. 119(e) based on U.S. Provisional Application No. 60/249,332, filed on November 16, 2000. Applicants respectfully request reconsideration of the present application in view of the following remarks.

Claims 1-5 and 10-19 stand rejected under 35 U.S.C. §102(b) as being anticipated by the Bahl reference. With regard to independent claims 1, 11 and 15, the Examiner contends that Bahl discloses each of the elements set forth in the subject claims. Applicants respectfully disagree with the Examiner's contention. Bahl is directed to apparatus and methods "for <u>training</u> the statistics of a Markov Model speech recognizer to a subsequent speaker <u>after the recognizer has been trained for a reference speaker</u>" (Bahl; column 1, lines 10-12; emphasis added). According to Bahl, the time necessary for each subsequent speaker to utter text during training is reduced by using "(a) data determined <u>during the training</u> of the speech recognizer to a reference speaker and (b) similarity relations between data generated for the reference speaker and data generated for the subsequent speaker during utterance of the shortened sample text" (Bahl; column 3, lines 35-39; emphasis added).

In contrast to Bahl, the present invention is configured so as to <u>eliminate the need for obtaining and utilizing training speech data</u> without suffering any noticeable loss of accuracy (specification; page 3, lines 1-2). To accomplish this, in accordance with an important aspect of the invention, transformation of speech features vectors is performed in a linear spectral domain of feature space (specification; page 3, lines 8-9). Specifically, claim 1, and claims 11 and 15 which are of similar scope, requires at least "computing an original spectra for each feature vector and corresponding mean vector; estimating one or more transformation parameters which maximize a likelihood of an utterance; and transforming a current feature vector using the estimated transformation parameters and maximum likelihood criteria, the transformation being performed in

a <u>linear spectral domain.</u>" in this manner, the claimed invention is able to transform feature vectors "without the need for matrices, complex neural networks or the like associated with, for example, conventional logarithmic transformation architectures" (specification; page 6, lines 11-13). Applicants submit that Bahl fails to teach or suggest at least these features of the claimed invention.

The Examiner contends that Bahl discloses the step of "computing an original spectra . . . mean vector" at column 5, lines 34-48 and column 17, lines 12-16 (Office Action; page 3, first paragraph). Applicants respectfully disagree with this contention. While Bahl may disclose, at column 5, lines 34-48, determining which speech type best represents a feature vector generated during a given time interval, each speech type representing a distinct cluster of sounds in a spectral space, Bahl fails to disclose computing an original spectra for each feature vector and corresponding mean vector, as recited in the subject claims. Moreover, Bahl, at column 17, lines 12-16, merely discloses, with reference to FIG. 15, that processor 608 performs a <u>linear averaging of contrast probabilities</u> inputted thereto (Bahl; column 17, lines 12-14). Bahl fails to disclose any mean vector, and moreover fails to disclose computing an original spectra from each feature vector and corresponding mean vector, as required by claim 1.

The Examiner also contends that Bahl discloses the step of estimating one or more transformation parameters "as maximum likelihood estimator (Fig. 15, subblock 608)" (Office Action; page 3, first paragraph). Applicants respectfully disagree with this contention and submit that, with reference to FIG. 15 of Bahl, block 608 represents a "maximum likelihood smoother processor" which performs a linear averaging of contrast probabilities that are inputted thereto (Bahl; column 17, lines 11-14). The processor 608 disclosed in Bahl does not perform an estimation of transformation parameters, but rather generates "smoothed probabilities" (Bahl; FIG. 15), and is therefore not analogous to the estimating step set forth in claim 1.

Bahl also fails to disclose the step of "transforming a current feature vector . . . in a linear spectral domain," as required by the subject claims. The Examiner contends that Bahl discloses this step at column 16, lines 62-65. Applicants respectfully disagree with this contention. Bahl, at column 16, lines 62-65, states: "The output from a deleted estimation processor includes (i) linear averaged transition probabilities and (ii) linear averaged label output probabilities, where the probability distributions are smoothed." The prior art of record simply fails to disclose that the <u>feature vectors are transformed in a spectral (frequency) domain</u>, as explicitly required by the

claimed invention. Applicants assert that "linear averaging" of probabilities, as taught by Bahl, is not remotely analogous to a <u>transformation of feature vectors in a linear spectral domain</u>, as recited in claims 1, 11 and 15. Furthermore, it is clear from the Bahl reference that the computations disclosed in Bahl are performed in a <u>time domain</u>, rather than a linear spectral (frequency) domain (see, e.g., Bahl; column 15, lines 40-61). Bahl thus teaches away from the claimed invention in at least this regard. The only mention of "spectral space" whatsoever in Bahl relates to the <u>representation of speech types</u> in a spectral space, as may be performed by a traditional acoustic processor (Bahl; column 5, lines 19-26, 34-36). However, this is completely unrelated to transforming feature vectors in a linear spectral domain, and is thus non-analogous to the claimed invention.

For at least the reasons set forth above, Applicants assert that independent claims 1, 11 and 15 are patentable over the prior art of record. Accordingly, favorable reconsideration and allowance of these claims are respectfully solicited.

With regard to claims 2-5 and 10, which depend from claim 1, claims 12-14, which depend from claim 15, and claims 16-19, which depend from claim 15, Applicants submit that these claims are also patentable over the prior art of record by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons set forth above. Moreover, one or more of these claims define additional patentable subject matter in their own right. For example, claims 2, 12 and 16 further define the step of transforming the current feature vector as being performed in a feature space, while claims 3, 13 and 17 further define the step of transforming the current feature vector as being performed in a model space. The prior art of record fails to disclose at least these additional features of the claimed invention.

The Examiner contends that, as per claims 2, 3, 12, 13, 16 and 17, Bahl, in FIG. 9, "teaches both transforming current feature vectors and model vectors" (Office Action; page 3, paragraph 2). Applicants respectfully disagree with this contention. FIG. 9 of Bahl discloses an illustrative probability initializer 300 for providing "starting point probability values from which accurate informative probability values may be determined" (Bahl; column 12, lines 30-32). While Bahl may disclose inputting reference feature vectors into "Labelling Element" block 302, Bahl clearly fails to disclose performing a <u>transformation</u> of feature vectors in a <u>model or feature space</u>, as required by the subject claims.

For at least the reasons stated above, Applicants submit that claims 2-5, 10, 12-14 and 16-19 are believed to be patentable over the prior art of record, not merely by virtue of their dependency from their respective base claims, but also in their own right. Accordingly, favorable reconsideration and allowance of claims 2-5, 10, 12-14 and 16-19 are respectfully requested.

In view of the foregoing, Applicants believe that pending claims 1-23 are in condition for allowance, and respectfully request withdrawal of the §102 rejection.

Respectfully submitted,

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Wayne L. Ellenbogen
Attorney for Applicant(s)
Reg. No. 43,602
Ryan, Mason & Lewis, LLP
90 Forest Avenue
Locust Valley, NY 11560
(516) 759-7662